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APPLICATION

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TITLE: BELT LOOPING

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BELT LOOPING

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation application of and claims priority to U.S. Application Serial No. 09/780,616, filed on February 8, 2001, and International Application No. PCT/US01/04328, filed on February 8, 2001, both of which claim the benefit of U.S. Provisional Application No. 60/181,492, filed on February 10, 2000.

BACKGROUND

It is known to use belts to connect between a motor of a stage light, or luminaire, and a driven element of the stage light. Motors often drive the various mechanical elements of a luminaire and allow the luminaire to perform many of the different functions that it carries out.

Color changing elements for such a luminaire often effect color changing by moving a color changing element. Therefore the motor becomes an essential part of this function. Since the luminaire is designed for projecting on a stage, the light output is usually very intense. This intense light, or more specifically the light beam within the luminaire, can often

generate large amounts of heat. This heat can significantly damage belts that drive mechanical elements within the luminaire, especially if they are located too close to the light beam. For instance, there are often space limitations which restrict the choice of location for a motor relative to it's associated driven element. In some cases, the conventional path followed by the drive belt places it in, or very close to the light beam. This becomes even more of a problem when the intensity of the light is increased. For example, in the Light and Sound Design ™ Icon-M ™, a 700 watt or even a 1200 watt bulb may be used. This can greatly increase the heat in such a system.

SUMMARY

The present application teaches an alternative method of using a belt to drive a driven element in a luminaire device, and specifically in such a device that uses a large amount of light, e.g., more than 300 watts, more preferably more than 500 watts, and even more preferably, more than 600 watts. The belt is run in a specific way to keep it away from the heat as much as possible.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a schematic of the belt paths.

Figure 2 shows a block diagram of the entire system.

DETAILED DESCRIPTION

A schematic view of the system is shown in Figure 2. A lamp 300 produces a high intensity light beam 305. This light beam is directed onto a cold mirror 315 and some of the heat within the light beam is removed by the cold mirror, (due to the mirror's ability to pass infra red light and reflect visible light). The "cooled" light beam 320 is then coupled to a Digital Micromirror Device (DMD) 325, and reflected again as light beam 330. Even though some heat is removed from the light beam by the cold mirror, a significant amount of heat is usually still present in the reflected light beam, and enough that could damage a drive belt.

Driven element 120 is shown in the path of the light beam 330, although it could alternatively be in the path of light beam 320 or even light beam 305.

A schematic of the driven element 120 is shown in Figure 1. This system uses two idlers 115 and 125 maintaining drive to a

pulley by means of a belt, but also keeping the belt out of the heat.

A motor 100 drives a pulley 102 that in turn drives the belt 150. The driven element 120 intersects the light gate 130, thereby altering the light in some way, e.g. altering the color or shape of the light. The driven element 120 is mounted on a pulley 110.

According to this system, two idlers shown as 115 and 125 are used. The belt is wrapped around the pulley 102, the outside of idler 125, around a portion of pulley 110 which is typically on the opposite side of the pulley to the light gate 130, and around the outside of idler 115.

In the disclosed embodiment, both sides of the belt are required to transmit drive, therefore a double-sided belt is used, (i.e. one having teeth on both sides). Alternative systems may use a single sided belt. For example, a second pair of idlers may be used to wrap the belt around a portion of pulley 102 in the same manner as for pulley 110.

Note that if the belt were connected around the pulley 110 in the conventional manner, it would pass along the path 140, and therefore close to the light gate 130. The conventional (prior art) system would cause the belt to come very close to

the light gate at area 142. This heat can cause the belt to operate beyond its thermal limitations, and therefore can cause premature failure of the belt. The present system enables the belt to be kept away from the light gate, and consequently away from the heat.

Although only a few embodiments have been disclosed in detail above, other modifications are possible.